

DEPARTMENT OF EDUCATION
AND SCIENCE

building bulletin

1

NEW
PRIMARY SCHOOLS
(Second Edition)



BUILDING BULLETIN No. I

(Second Edition)

NOTE: Although this Bulletin was originally written in 1949 and revised in 1955, the general principles remain valid. The experience it records can usefully be augmented by reference to Building Bulletins numbers 3 (*Village Schools*), 16 (*Development Projects: Junior School, Amersham*), 36 (*Eveline Lowe Primary School, London*) and 47 (*Eveline Lowe Primary School Appraisal*)

August, 1955
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NOTE: Passages in this edition which differ from those in the first are marked with a side line in the margin.

FOREWORD

This bulletin is a new venture. It has been obvious for some time that there is a need for guidance on educational building matters which is less formal than regulations, circulars or administrative memoranda, and which will reach a wider audience than official letters. The bulletin is designed to meet this need. It does not take the place of more formal documents such as the Building Regulations or the Memorandum about them, but, being of a more flexible and empirical character, it can take account, in a way which they cannot, of changing ideas and techniques. As the views of its authors evolve by discussion between their readers and themselves and by experience gained "on the ground," each subject covered by the bulletin will be reviewed.

2. We hope that architects will find the bulletin useful. But it will not serve its purpose unless it evokes the interest of all those whom architects regard as their clients. All experience since the war suggests that good schools can be speedily and economically built only if there is the closest co-operation between everybody concerned.

3. This first number deals with the primary school: it outlines recent trends in primary education and tries to describe their architectural implications. In later numbers we propose to cover in more detail specific

problems such as heating, lighting, building techniques, cost and plan analysis. The next main subject will be the secondary school, a study of which is now in progress.

4. A casual reader might gain the impression that the quality of building and equipment discussed in this number can be provided only at considerable expense. Post-war experience has, however, already proved that this is not necessarily so. Where real skill has been brought to bear on problems of design, high standards have been accompanied by relatively low costs. A principal aim of the bulletin is to review means by which this process can be continued, with particular emphasis on the progressive lowering of costs. In this number cost is discussed in some detail on page 43, and more information will be circulated as soon as a comprehensive investigation on the subject, which the Ministry has in hand, is further advanced.

5. In preparing this number we have had considerable help from teachers and from officers of local education authorities, to whom we are most grateful.

6. Any comments on the bulletin or suggestions about future numbers will be welcomed. Readers are asked to address any letters to The Editor, THE BUILDING BULLETIN, Ministry of Education, Curzon Street House, Curzon Street, W.1.

FOREWORD TO SECOND EDITION

7. Since the first edition was published in 1949, further economies have been achieved in the design of primary schools. Nothing in these more compact schools, however, contradicts the basic principles described in the first edition, and it is proposed to leave the main body of the document as it stands, correcting only certain obvious

anachronisms. Some aspects of primary school planning have been dealt with in greater detail in more recent Building Bulletins. Attention is drawn particularly to Building Bulletin No. 4 (Cost Study), No. 9 (Colour in School Building), No. 10 (New School Playing Fields) and No. 11 (The Design of School Kitchens).

these components will have to be so designed that they can be assembled quickly on the site by a small labour force. Some work in this direction has already been

done; but more must be done, and done quickly, if the concurrent problems of quality, quantity, speed and economy are to be solved.

GENERAL SPACE REQUIREMENTS

24. The spaces required in primary schools can, very broadly, be divided into three main categories :

- (1) those spaces which are common, or shared by several or all class groups of children. They include most of the garden and outdoor play spaces, the entrance space, the hall, the dining room (where one is provided), and the circulation areas.
- (2) those spaces which are special to individual class groups of children. They include the class spaces, each the "home" of a particular group of children, with perhaps a part of the garden to be used as an extension of the class space; and the children's coat-hanging and sanitary accommodation (if these are dispersed and not centralised).
- (3) those spaces which are concerned with the organisation and maintenance of the school. They include accommodation for the teaching staff, for medical inspection, stock and cleaning

equipment; the kitchen with its ancillary rooms and the boiler house.

25. The many and variable local conditions make it undesirable, and even impossible, to give specific arrangements of these areas, but before discussing each of them in greater detail, it may be helpful, at the risk of over-simplification, to note these general principles:

26. The common, or shared spaces—the entrance space, the hall and the dining room—are the centre of the life of the whole school, and should be expressed as such architecturally, with the entrance as the space from which all other areas are accessible. The class spaces, and their ancillary rooms, should be grouped about this common centre, avoiding long, unbroken lengths of corridor, but providing the easiest flow of circulation between all parts of the building. (See Diagram No. 1.) A school, like the human body, is an organism whose separate parts should be in proper relation to the whole, with all its limbs in proportion.

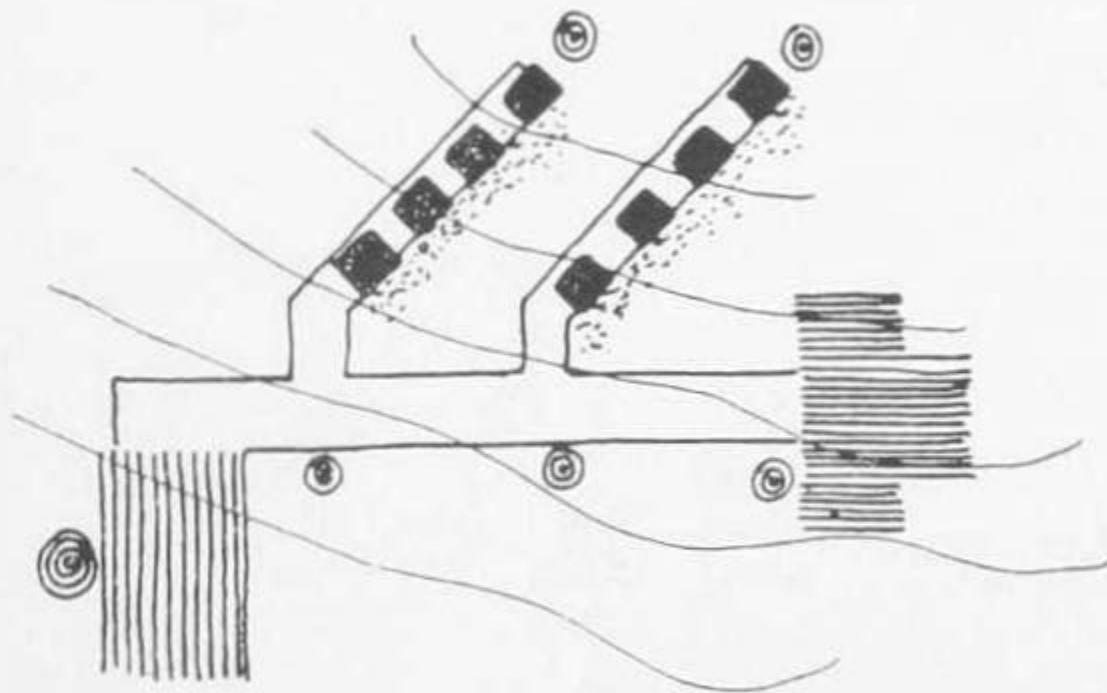
THE SITE

The school environment

27. The earliest schools were too often built on bits of land backing on to railways, gas-works or noisy yards; and even since the war schools have had to be sited on unwanted patches of land which have

been left over after the best sites have been taken up for houses. But the school of to-day has considerable social significance and, with its increased site area, must become an important and integral part of its surrounding neighbourhood. A school is not merely a building,

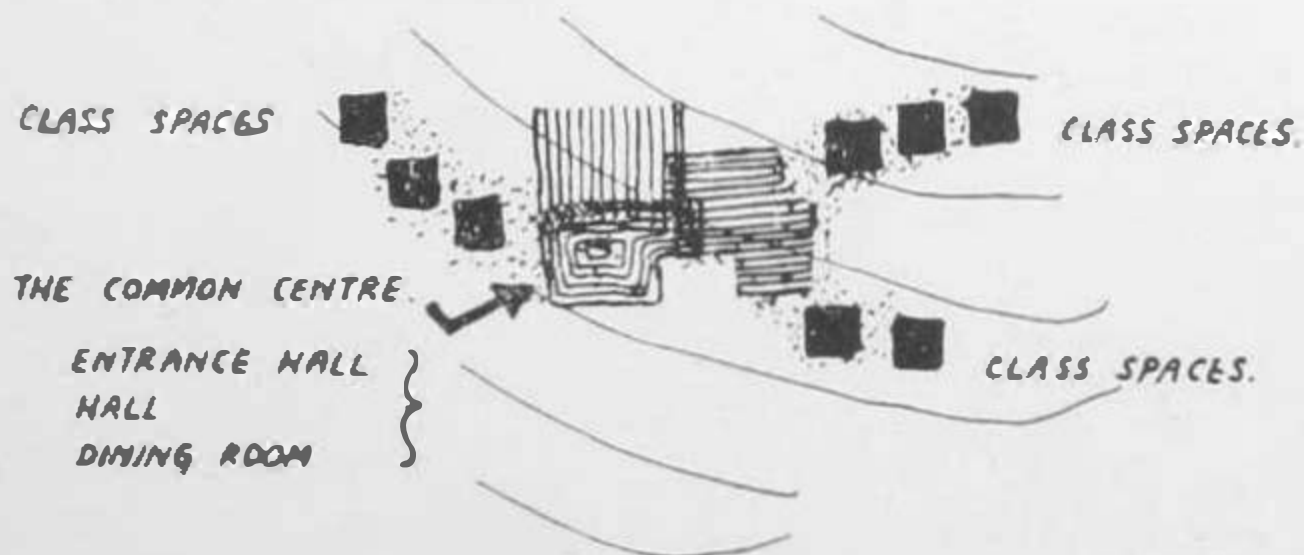
THIS DIAGRAM IS SYMBOLIC OF MANY SCHOOL BUILDINGS WHERE NEITHER EDUCATIONAL IDEAS NOR THE QUALITIES OF A HUMAN ENVIRONMENT HAVE BEEN CLEARLY EXPRESSED.



THIS KIND OF ARRANGEMENT LIMITS ARCHITECTURAL EXPRESSION AND IS UN-ADAPTABLE TO EDUCATIONAL IDEAS AND TO THE VARYING CONDITIONS OF SUN, VIEW, AND CONTOURS.

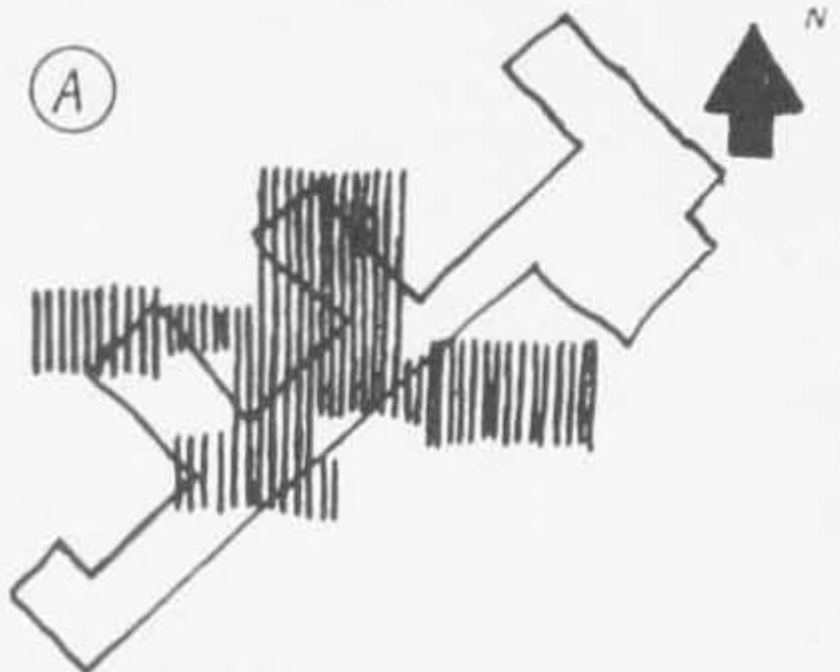
THERE ARE BROADLY TWO KINDS OF SPACES IN A PRIMARY SCHOOL, THE COMMON CENTRE SHARED BY ALL CLASS GROUPS AND THOSE WHICH ARE FOR INDIVIDUAL CLASS GROUPS.

THE HEART OF THE SCHOOL IS THE COMMON CENTRE OFF WHICH THE LIMBS (CLASS SPACES) SHOULD BRANCH.

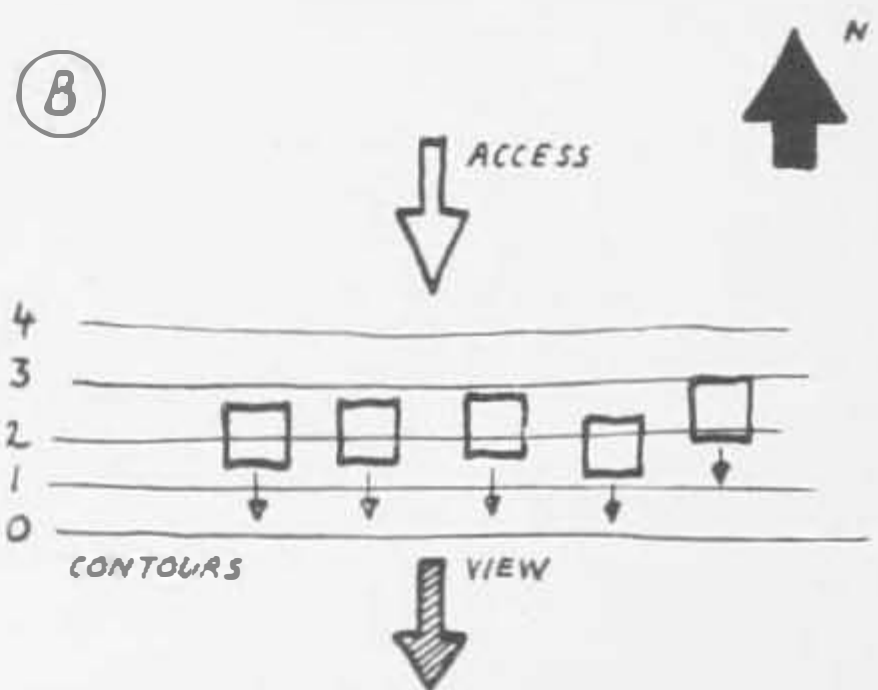


THIS CONCEPT IS CONDUCTIVE TO GREATER ARCHITECTURAL FREEDOM. IN THE COMMON CENTRE EXCITING SPATIAL ARRANGEMENTS ARE POSSIBLE. IN THE CLASS SPACES AN INDIVIDUAL AND DOMESTIC CHARACTER IS NEEDED. THE TYPE OF STRUCTURE SHOULD BE CONDITIONED LARGELY BY THESE BROAD EDUCATIONAL REQUIREMENTS.

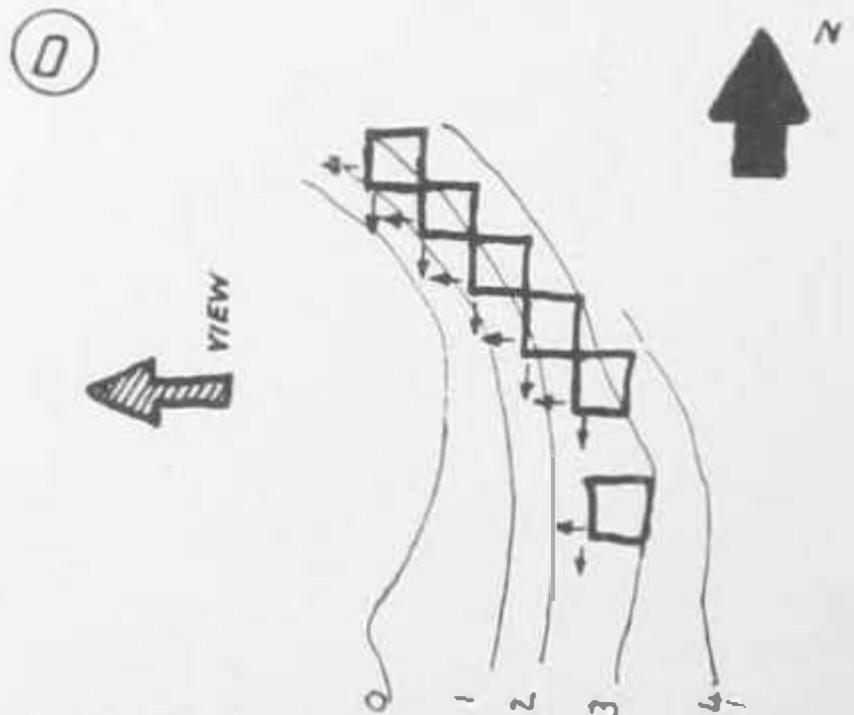
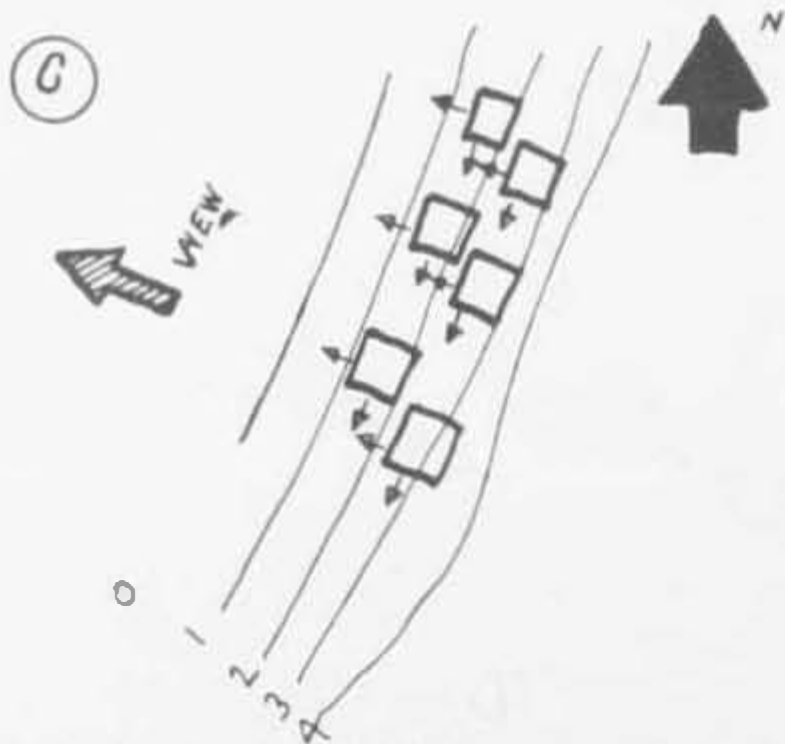
DIAGRAM.
1.



ON **FLAT SITES** BETTER & CHEAPER SCHOOLS CAN BE BUILT IF A COMPACT DESIGN IS SUBSTITUTED FOR A SPRAWLING ONE.



THESE SITE CONDITIONS PERMIT THE SIMPLEST DESIGN SOLUTION GETTING BOTH SUN AND VIEW.

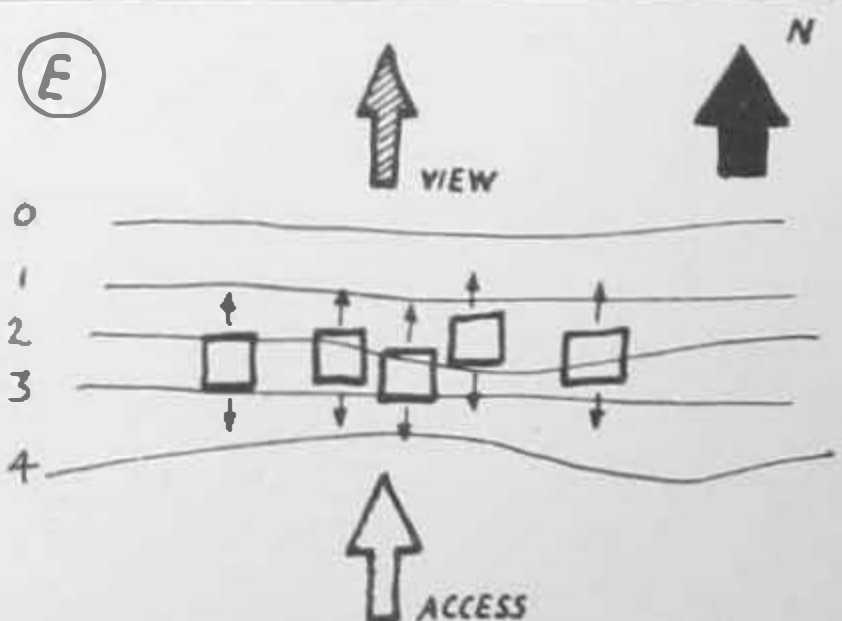


TWO TYPES OF SITE CONDITIONS WHERE ONLY BY STAGGERED PLAN ARRANGEMENTS CAN EACH CLASS UNIT GET BOTH SUN & VIEW.

NOTE:-

ECONOMY IN SITEWORKS CAN BE ACHIEVED IF BUILDINGS ARE ALWAYS DESIGNED PARALLEL WITH CONTOURS. TO DO THIS, AND ACHIEVE GOOD VIEW AND SUN CONDITIONS ON VARYING TYPES OF SITES WILL REQUIRE A METHOD OF CONSTRUCTION PERMITTING FLEXIBLE PLANNING AS 'C' AND 'D'.

DIAGRAM 2. RELATIONSHIP OF BUILDING FORM TO SITE CONDITIONS.



THIS TYPE OF SITE CONDITION CALLS FOR SPECIAL PLANNING ARRANGEMENTS TO COMBINE BOTH SUN & VIEW TO EACH CLASS UNIT WITH ECONOMY OF SITEWORKS

single full sized pitch. In some built-up areas it may not even be possible to include the playing field as part of the site.³

Planting and garden design

41. The following paragraphs may perhaps be read with scepticism by those who have to deal with very restricted urban sites, but there are many rural and suburban sites to which they apply, and even the smallest town site has room for something green, on however small a scale. Often, if the garden and site lay-out is given consideration at all, the formal landscape devices usually relied on do not provide the right kind of background for children. It must be remembered how important the garden treatment of a school site is as an educational factor. The question has to be asked: "Is this a place in which children can enjoy themselves?" Children should be surrounded by trees and plants, and not by asphalt only; their interest will quickly be aroused if they are encouraged to learn about and to care for the garden. A plan of the whole school and garden might be exhibited, with the names of the trees, shrubs and flowers to which the children could add their own records of planting.

42. Any existing natural features—trees or hedges, irregularities of the ground in the form of hollows or banks, a stream or a pond—need to be considered in the lay-out, as they will add to character, and ought to be preserved wherever possible. Existing trees are very valuable so long as they are healthy. If they are not it would be better to plant new large-growing trees rather than to preserve decayed ones at great expense. (If a tree is felled, parts of its

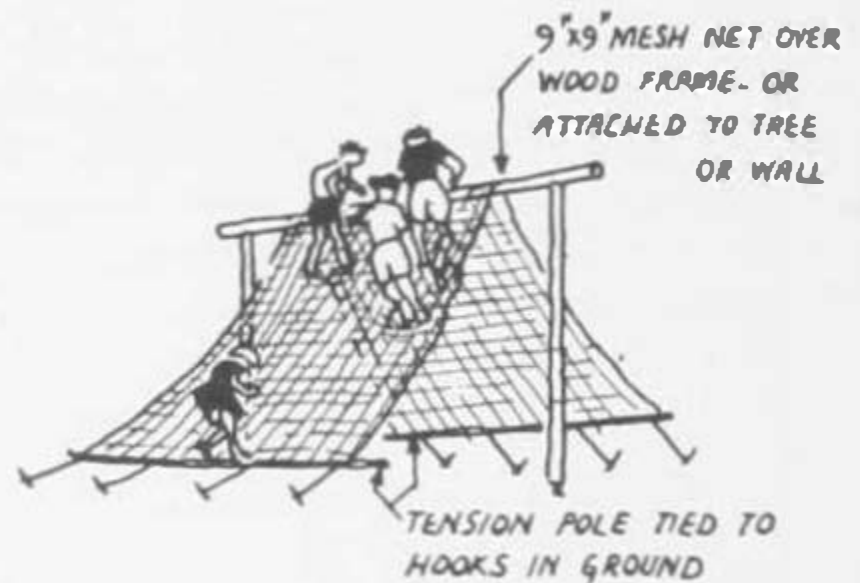
trunk or larger branches can be used for children to climb over.) Often it is possible to trim them instead of felling them altogether, but this must be done with great care. The need for large trees has to be emphasised, because very often the school site is an important open space in the middle of a housing estate, and offers the best opportunity for such planting. Tree siting must be thought of in relation to the building itself, to the skyline within the general landscape, and to possibly unwanted views of other buildings which might be masked. These trees will also help to provide shady out-door teaching spaces in the summer. It is quite possible to plant at the same time smaller, more rapid-growing trees for quick effect, these smaller ones being cut away as the slower-growing trees mature. One danger of tree-planting must be remembered: the depth of the sub-soil. Tree stations need about 18 inches depth of top-soil, and if clay sub-soil occurs above this level, it is essential to provide drainage. This is easier and less expensive for a group of trees than for several isolated ones.

43. All the top-soil should be saved, and it should be clearly specified that it should not be mixed up with any of the sub-soil. Depths required for different
6 inches for turf, 9 inches minimum for flower beds, and as already mentioned, 18 inches for tree stations. Surplus sub-soil may be useful to vary the garden levels; for example to create banks or small mounds where children can clamber. The existing top-soil should be taken off before the sub-soil is dumped, and spread over the top again. Sometimes in rural sites a small area which was left to revert to scrub and small seedling trees would be welcomed, as it would provide an opportunity for botanical investigation and constructive work for the children.

³See Building Bulletin No. 10, "New School Playing Fields", especially paragraphs 7-13, for more detailed suggestions on playing fields in primary schools.



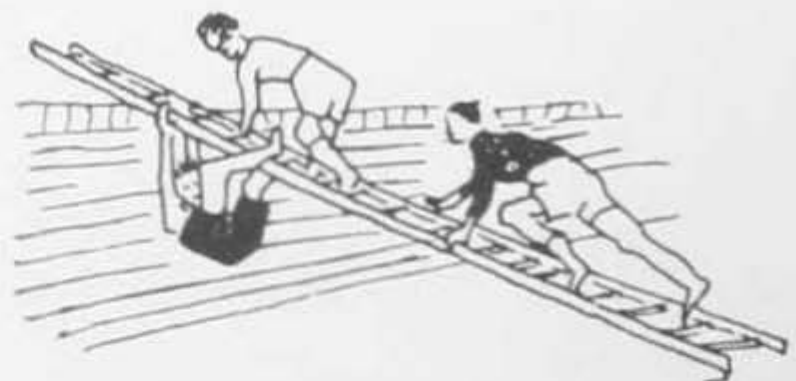
MOCK UP CLIMBING FRAMES.



COMMANDO NET



PARALLEL ROPES



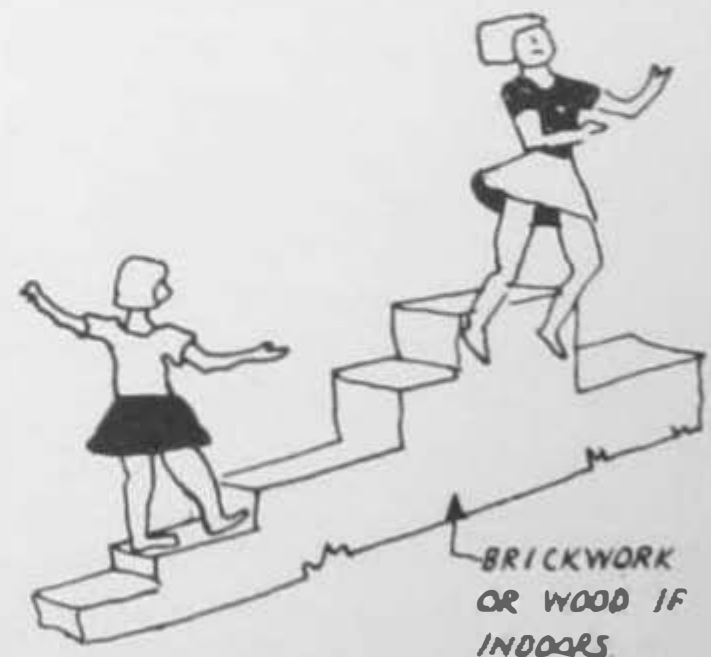
MANY IMPROVISATIONS ARE POSSIBLE

USE OF LADDERS

1. IMPROVISATIONS ARE ENCOURAGED TO SUIT LOCAL CONDITIONS.
2. OLD TREE TRUNKS MAKE GOOD CLIMBING FRAMES.

DIAGRAM.
4.

PLAY EQUIPMENT



BALANCING AND JUMPING WALL.

shape to climb over. If a wall for ball games is not provided near the playground one will probably be found in a less suitable place. A swing, a rope ladder, a see-saw, a slide, a commando net are all popular, and it should be possible to provide at least some of these. The youngest children will enjoy a simple bank to roll down, or a low wall to balance on. (See Diagram No. 4.).

50. In addition to this play equipment,

provision must be made for the small groups of children intent on personal activities and experiments of their own. Children need to live with and to watch other growing things—trees, flowers, animals, fishes, birds, insects. They should have small private gardens, perhaps a pond, perhaps some accommodation for animals. Also they will be making things with their hands: the youngest children should have some sand, and some may like to build with stones or bricks.

THE ENTRANCE SPACE

51. It generally used to be taken for granted that schools should have one entrance for grown-ups and separate, rather mean, entrances for boys and girls through sombre corridors flanked by cloakrooms and lavatories. But is it right to separate the children's entrance in this way from the "public" or "visitors" entrance? Or should there be one main entrance for all with subsidiary ways out to link the garden with the different parts of the school? If the school is really to belong to the children and teachers, surely they all have the right to come into their building through some reasonably dignified and gracious space. The entrances for the youngest children will be mentioned later, with the suggestion that these infants might perhaps be able to have their own self-contained accommodation with their own front doors. But if there is to be an entrance to serve the hall, it seems that this could be used daily by the older children, the staff and the visitors, and not just kept for special and rare occasions. Moreover, one spacious entrance is likely to be more useful, more aesthetically satisfying, and cheaper than several scattered smaller ones.

52. This entrance, the hall and the dining room are the centre of gravity of the whole school, and as they are the largest individual planning elements they are, if handled with imagination, capable of really interesting architectural treatment. Not only are they the social meeting places for the children but, with the growth of parent-teacher associations, parents will be taking an increasingly active interest in the school, and will mix with the children and teachers here. These functions suggest a certain amount of freedom of communication between all three spaces with sliding and glazed screens giving opportunities for a variety of uses, and exciting three-dimensional design. Also, if changes of level necessitated by site conditions can be arranged in this area, fine spatial effects can be achieved which would be lost if the change of level occurred in corridor links.

53. The entrance space can be designed to give a gracious and welcoming impression of the school when one first enters it. It should be immediately clear where the head teacher's room is, so that visitors will not have to wander helplessly in search of it.

A SQUARE HALL IS MORE SUITABLE FOR YOUNGER CHILDREN'S ACTIVITIES.

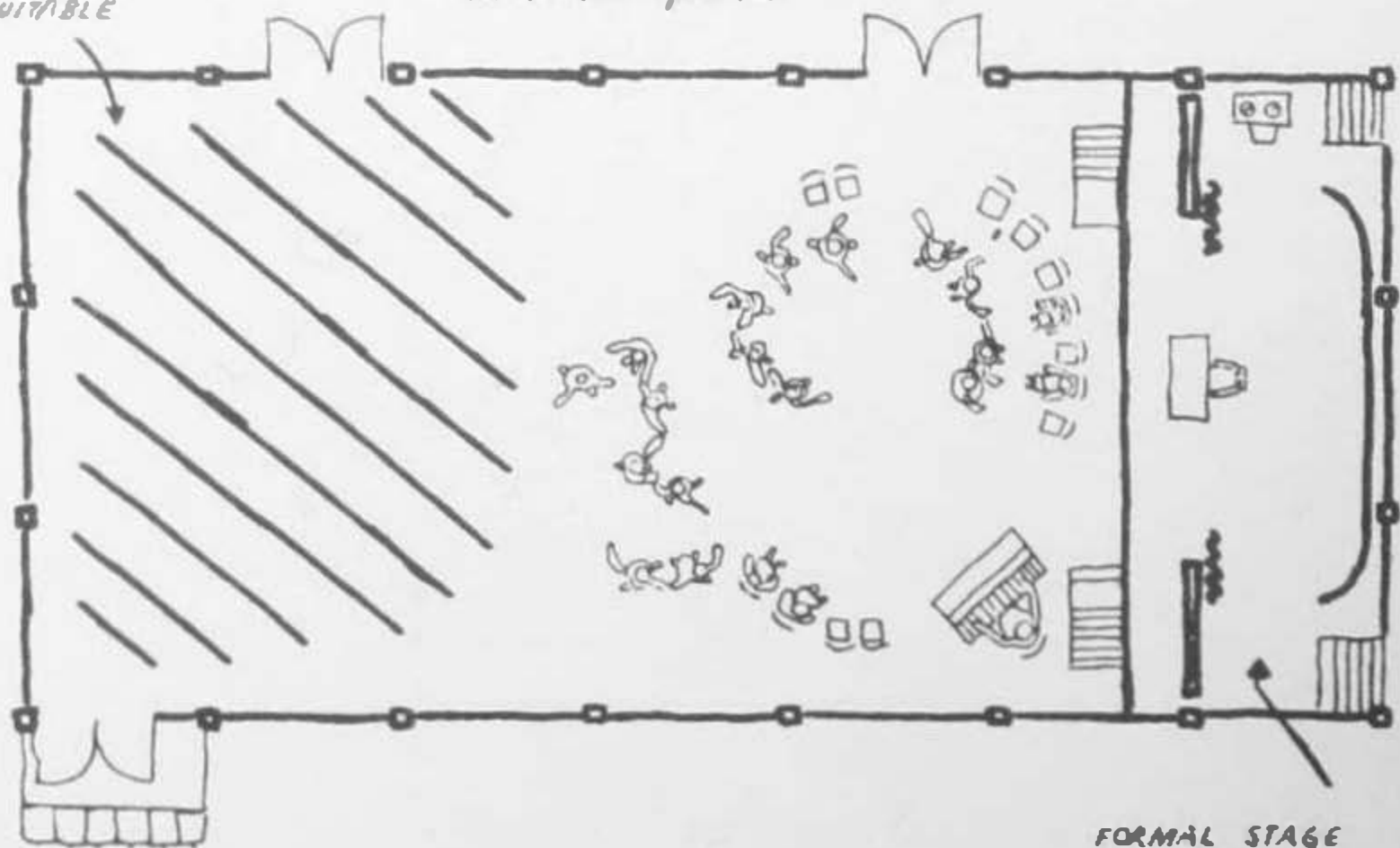
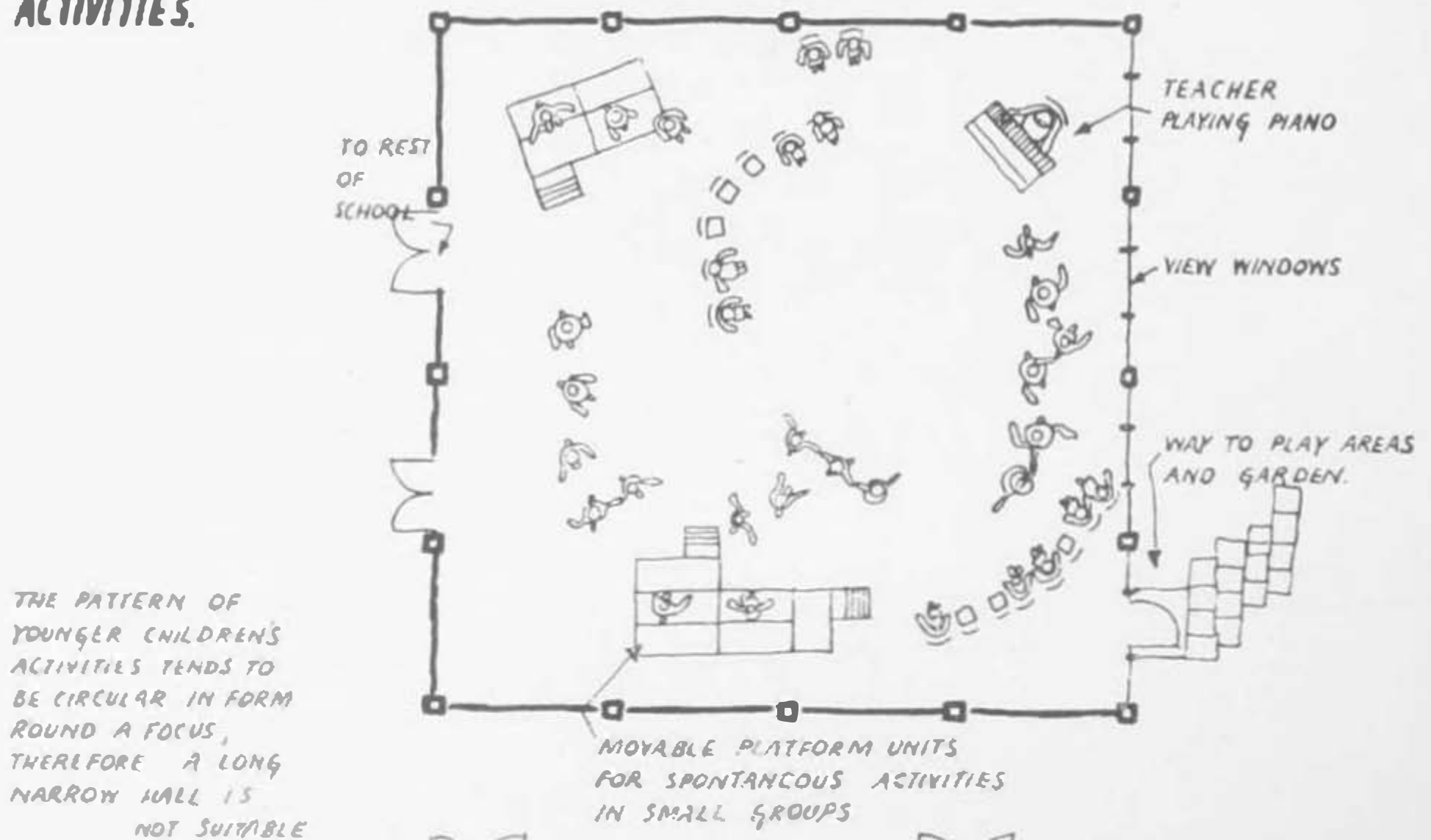


DIAGRAM.
5.

HALL DESIGN FOR INFANTS

66. Storage space will be necessary for properties, musical instruments, dressing-up materials. This should be readily accessible. There should be plenty of circulation space outside the hall, and easy access to lavatories and to class spaces. Access at one end only of the hall can never be satisfactory.

Colour⁴

67. A large space of this kind will need a simple, balanced scheme of colour, without too much intricate detail, but with sufficient vitality to be stimulating and to avoid the risk of becoming dull.

68. Generally, ceilings should be lighter than floors. Walls should not be broken up into different colours, and light-reflecting colours should be used near the windows. Some bright or contrasting colours or features help to bring the interior into focus, but the common device of painting the doors in such colours may break up the wall-surface too much, and destroy the simplicity and unity of the general scheme. The texture and pattern of curtains, if they are provided, will enrich the hall. Since they are light and movable it is more appropriate that they, rather than the wall-surface should provide the vitality and gaiety. Curtains, specially if they are dark in tone, should be fixed so that they can draw past the actual window openings. Probably the cost of ceiling to floor curtains cannot be justified, but the practice of providing separate clerestory curtains may not be satisfactory because they attract too much attention upwards. Screening at a high level can be provided by blinds.

Windows

69. It is difficult to know how to strike a proper balance between the needs of

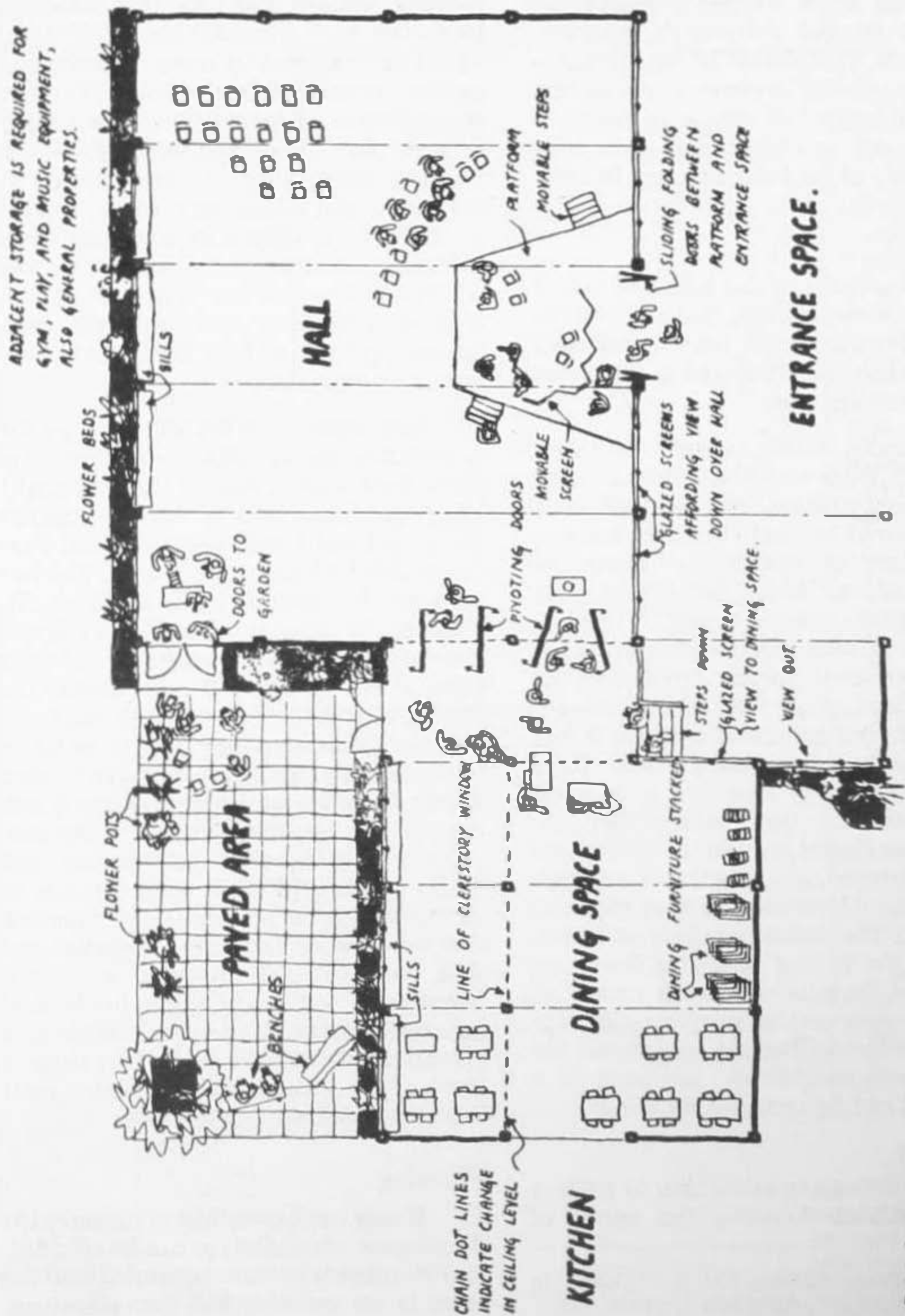
physical training (for this, windows not below children's shoulder level (3 ft. 4 in.) would be welcomed by some teachers) and general amenity. Clearly there will be a greater sense of space and a closer unity between the building and the garden if the windows come down to the ground, or near to it, and this appears to be justified in spite of the difficulties connected with ball games and races, provided that the low windows occur on one wall only. Some form of protection such as wired glass bottom lights, or low horizontal bars, should be provided.

70. Easy access from the hall to the garden is certainly an advantage; whether it is direct from the hall itself or from a draught lobby combined with a store for games equipment and larger apparatus, can only be decided by local requirements. The two positions for opening lights are from 2ft. 0 in. up to door head level, and cross-ventilating clerestory windows. Opening lights at other levels will only increase the cost unnecessarily. For the high windows, the same points of design have to be taken into account as for the clerestories in class spaces. Some precaution such as sun blinds may have to be taken to avoid sharp contrasts of light and shade on the floor, and dazzle for children's eyes when they run or dance towards the windows. It is important that the windows can be easily opened and shut, but with the minimum of heavy, complicated fixtures. Simple mechanical gearing is preferable to either pole or cord operation. If gearing is used, those parts in front of the glass should be painted matt white, as should the window bars.

Flooring

71. If only small quantities of higher grade flooring are obtainable, or can be afforded, it will probably be more appropriate to use them in the assembly hall than elsewhere.

⁴See Building Bulletin No. 9. "Colour in School Buildings", Appendix 1, paras. 1-3.



THIS DIAGRAM IS NOT A TYPE PLAN, BUT IS INTENDED TO SHOW THE ACTIVITY PATTERN IN THE COMMON CENTRE OF A JUNIORS' SCHOOL, AND HOW ADVANTAGE CAN BE TAKEN OF THE INTERESTING ARCHITECTURAL RELATIONSHIPS AFFORDED BY THESE SPACES.

DIAGRAM. 6.

Reasonable quality of floor finish is so important, in fact, throughout the whole school, that when severe economies are being contemplated, floor finishes should not by any means be the first items to suffer, as is often the case. A non-slippery, non-splinter surface is essential, in view of the fact that halls in primary schools have to serve also as gymnasias, and a slippery floor may cause accidents, especially where apparatus is used. The children will often run or dance with bare feet, and there should be some means of preventing dirt or gravel being brought in from the garden, whether the access is direct from the hall or through a lobby.

Acoustics

72. The conflicting requirements in these halls make it difficult to achieve a satisfactory acoustic treatment for all the

varying activities. In primary schools probably the most importance should be attached to singing, usually without an audience. Reverberation times of about 1.5 sec. (at 500 c.p.s.) have been measured in halls which the users found generally satisfactory.

Heating and artificial lighting

73. The points on artificial lighting and heating that will be mentioned under the heading of class spaces apply also to the hall, except that separate control may be an advantage if the hall is used out of school hours when the heating of the class spaces should be switched off. It is important to get agreement on the control of artificial light points, and the position of points for wireless loudspeaker and film projection, etc.

THE DINING ROOM

General character

74. The dining room also has its own particular character, its own educational importance. It is not good, either for the digestion or for manners, to scramble hurriedly through a meal in noisy, crowded, over-heated surroundings. School dining rooms can be imagined as gay and attractive restaurants. There is a variety of plan and section arrangements which may often be more interesting architecturally than those designs of dining rooms which are associated with war-time expedients. Windows will be generous (with wide sills for flowers) letting in sunshine at the very least between twelve and one o'clock when the children are having their meal, and perhaps french doors may lead out on to a sheltered paved terrace or garden. Then there seems no reason why the children should sit in institutional parallel rows

instead of in groups round tables of domestic size.⁵ The chairs and tables could then be light enough in weight for the children themselves to arrange or to stack away if the space is to be used during the later afternoon for other purposes.

75. The gaiety of this meals space will be increased by imaginative colour. The children will not be staying here for any length of time, and the general treatment can therefore be arresting and exciting, for these younger children enjoy simple, brilliant colours. Curtains, fittings, furniture, mural decorations, pictures, crockery—these should all contribute to, and be a part of, the whole design, and therefore they concern the architect closely.

⁵ "Family" organisation, which is discussed in Building Bulletin No. 11, offers a much more informal arrangement.

76. Inevitably there will be a tendency for the meals space to be noisy, with the moving of chairs, crockery and trolleys, and a good deal of high-pitched talking. All possible means must be considered by which noise can be reduced. A sound-absorbent ceiling will help, also curtains, the careful choice of floor finish (which needs also to be non-slippery).

77. Really efficient ventilation is of the utmost importance, particularly as dining rooms will often be planned in close relation to the entrance and the hall, so that they can be used as fully as possible throughout the day.

Service

78. The general tendency is for two child-

ren from each table group to fetch the food for their particular table. The service counter from the kitchen therefore needs to be as central as possible to enable the children to get their meals quickly and easily. This counter will be one of the main features of the room, and a focal point of the design, so that it should be treated decoratively; the counter fitting should be simple, with easily-handled opening doors. The whole question of the functional requirements and design of counters and hatch is amply discussed in Building Bulletin No. 11.

79. The kitchen and its ancillary rooms will be discussed in the section on administration rooms.

CIRCULATION SPACES

Educational requirements

80. In the past, corridors have often been under-lit, under-heated, and rather grim, with one purpose only—to act as traffic routes for children. It is true that traffic routes must be provided, but this being so, let them be used to the full, and become an integrated part of the whole school, not merely an appendix to it. The design of circulation areas which can be used for many purposes rather than for one only is not a luxury, but an economic necessity, and it is the architect's duty to ensure that the maximum amount of space in his school design shall be available for the fullest possible educational use. For instance, at the end of short runs of class spaces, it would be possible, by means of folding screens or panels, actually to enlarge the class area by throwing part of the circulation area into it. (See Diagram No. 7.)

81. Recesses and alcoves, interesting plan patterns (which may result from the informal arrangements of class spaces to suit contour and orientation conditions), wide sills, generous windows and plenty of wall surface suitable for pictures, posters and maps, will all help to convert these areas into pleasant, lively exhibition spaces. There will also be the possibility of treating them sometimes as small streets, with shops, banks, book corners and milk bars.

82. Nor will it be necessary, by so doing, to increase the percentage of circulation area; with careful planning it should be the designer's aim to get below 20 per cent of the total building area.⁶ This proportion

⁶See Appendix 1. The percentage of circulation area in these recent schools ranges from 3.7 to 16.3.

is not always achieved in schools which may appear superficially to be economical in circulation; the "strip" corridor is by no means always economical, giving access, as it so often does, to rooms on one side only.

Colour⁷

83. Here, where there will be constant movement, the colour treatment can be really bold, with large areas of bright colours. The old colour ranges, chosen primarily for their dirt-concealing properties, are fast disappearing. The decision to use light or dark colours should depend not upon dirt, but upon lighting conditions and the general effect required. Light colours can, after all, be cleaned, and children can, as at home, be taught to respect them. We should also be prepared to break away from what used to be considered indispensable—the dado. If dark colours are appropriate to the general colour scheme in certain areas, it would be best to avoid breaking up the wall surface, by taking them up to the ceiling.

84. As a high proportion of gloss paint may be used, its dangers have to be noted—for instance the reflection of adjacent colours, and the excessive shine caused by certain lighting conditions which is not only uncomfortable, but destroys the sense of colour and form. It is, of course, a mistake to assume that paint is the only finishing material for these wall areas, where the use of natural materials is to be encouraged. Fairface brickwork, stone, tiles, wall-boarding, wallpaper, fabric, all help to give interest and variety provided they are not used exclusively, and are considered in relation to the wear they will get. It must be remembered that some of these surfaces will have to withstand considerable wear and

tear, particularly at corners and near doors. Materials and finishes must therefore be selected which are strong and durable and can easily be cleaned.

Windows and doors

85. Large window lights in circulation areas need not always be ruled out; they can even come down to the floor if they are given proper protection (for instance, by a portable flower pot container across the full width of the window or wired glass). These windows will help to increase the sense of space in areas which have often induced a feeling of enclosure and restriction. Also, if there are pleasant views it is good to see them when moving about the school, and windows should be placed with this in mind. It must be remembered, though, that when one is walking parallel to a line of windows, views will often be seen in sharp perspective, and windows should be designed to avoid obstructions. Excessive contrasts between light and dark need to be avoided, though some variation in lighting will add interest. Where long strips of top lights are used, sky brightness can cause considerable discomfort unless the lights are designed to reduce the contrast.

86. Whenever there is access from the outside which is frequently used, draught lobbies are recommended, with carefully-adjusted self-closing equipment to minimise door banging—a frequent cause of irritation in schools. Moreover, no heating system can be expected to run economically where only a single pair of external doors is provided.

87. Because circulation spaces frequently have external doors at one or both ends, there tends to be too much rather than too little air circulating, and it is common for an excessive number of opening lights to be provided. Fixed lights are not only more

⁷See Building Bulletin No. 9. "Colour in School Buildings", Appendix 1, para. 7.

THIS DIAGRAM IS NOT A TYPE PLAN, BUT IS DESIGNED TO ILLUSTRATE THE WAY IN WHICH AN INFANTS CLASS ROOM WITH ITS STORE, CLOAKS, LAVS, OUTSIDE PAVED AREA, AND CIRCULATION AREA CAN BE GROUPED TO FORM A SINGLE SELF CONTAINED UNIT.

THE MINIMUM PERMANENT SUB-DIVISION BETWEEN THE DIFFERENT PARTS ENSURES THE MAXIMUM USE OF THE WHOLE FLOOR AREA, AND FACILITATES SUPERVISION OF A WIDE VARIETY OF ACTIVITIES.

THE ACCESS TO THIS UNIT WILL VARY. FOR INSTANCE IT COULD BE ONE OF A PAIR WITH CENTRAL ACCESS OR A TERMINAL UNIT OF A SHORT RUN.

THE UNIT IS PLANNED ON THE 59'6" GRID

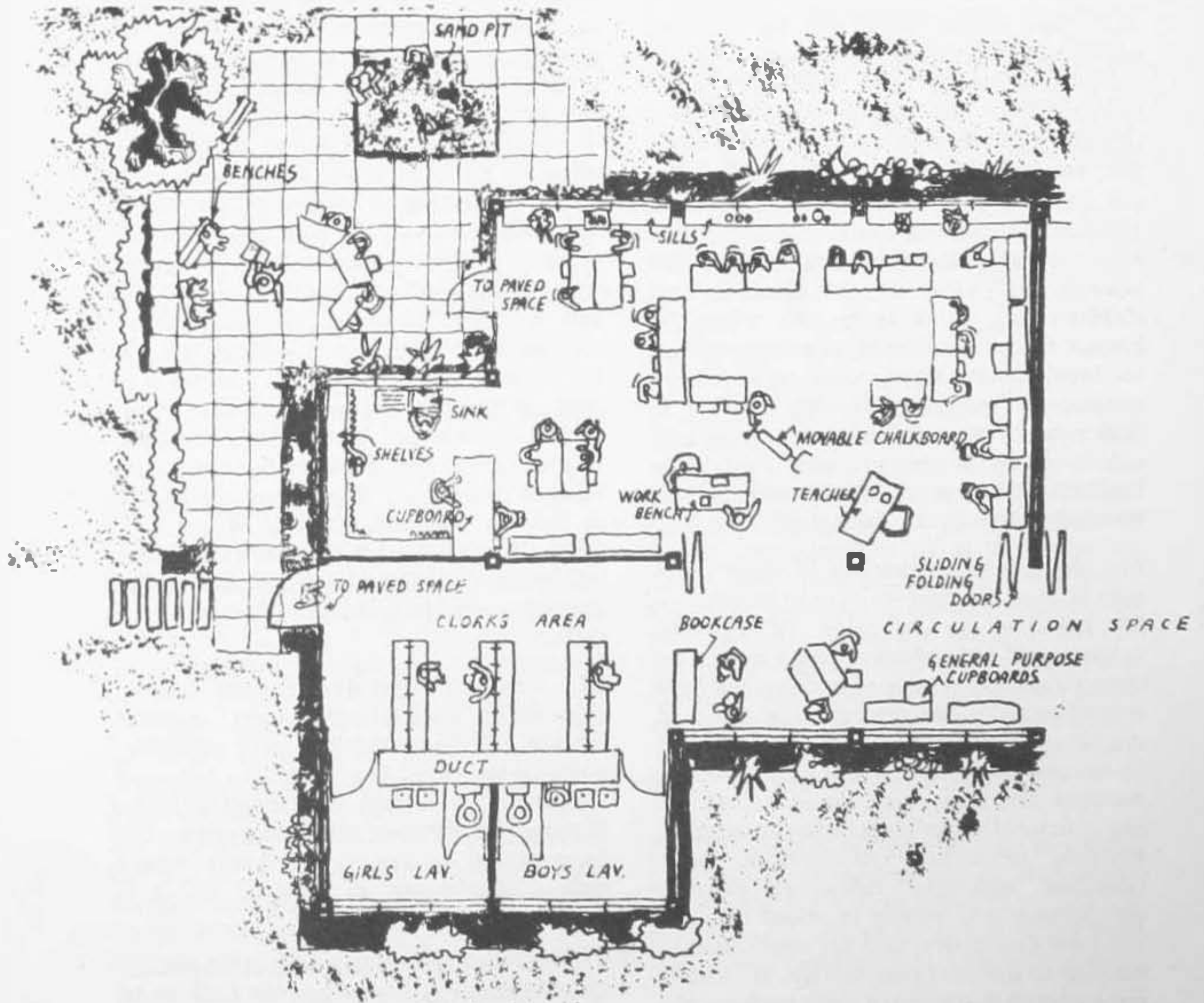


DIAGRAM
7. INFANTS CLASS SPACE.

pleasant to look through (having neater frames) but are about a third of the cost of opening lights. Where coats are hung in alcoves off need their separate cross ventilation.

Heating

88. Circulation areas will probably contain the main arteries of the heating system. Floor ducts for this purpose are often unnecessarily costly. As well as being expensive they involve large numbers of access manholes which are more appropriate on a pavement than inside a school. If the main flow and return pipes can be simply accommodated at a ceiling level, they can be designed to contribute to the

general heating of the circulation areas. When in the past corridors were treated solely as under-heated traffic tubes, they were a serious cause of draughts and heat loss from the adjoining class spaces. These defects will be avoided when, because of their wider use, the circulation areas are heated.

Sound absorption

89. A high degree of sound absorption in circulation areas must be achieved, particularly now that planning is becoming freer and more open. Ceiling and floor finishes which are sound absorbent are necessary.

CLASS SPACES

Approach to design

90. There is sometimes a temptation to generalise about the design of class spaces, and to assume that a string of identical compartments will be all that is required. Many have been built recently which seem to have been designed to give the perfect answer to one particular problem (such as daylighting), while failing to give sufficient consideration to other aspects. This incomplete approach has led very often to a rigid cross section, and has tended to set an almost standardised pattern, with no differentiation between older and younger children. But as much care is needed in assessing the changing requirements of class spaces as in assessing the requirements of the dwelling rooms of a house. It would be an excellent idea if architects were sometimes to set up models of varying types of class spaces, complete with furniture and equipment. In this way both the clients (and the architects) could really understand what they were going to get; bare outlines to sixteenth of an inch scale give insufficient

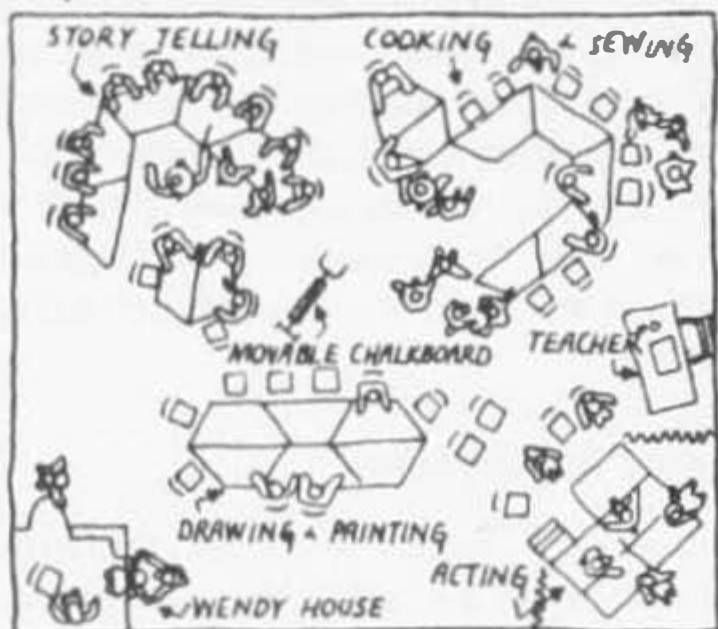
information when new ideas are being developed.

91. No one factor should ever be considered in isolation as they will all inevitably interact. Good designing will include the study of the educational needs of each particular age group of children; of general character and scale; of fixed equipment and furniture; of colour treatment, daylighting, sunshine and artificial lighting; of sound insulation, ventilation and of heating. These different aspects of discussed in the notes that follow.

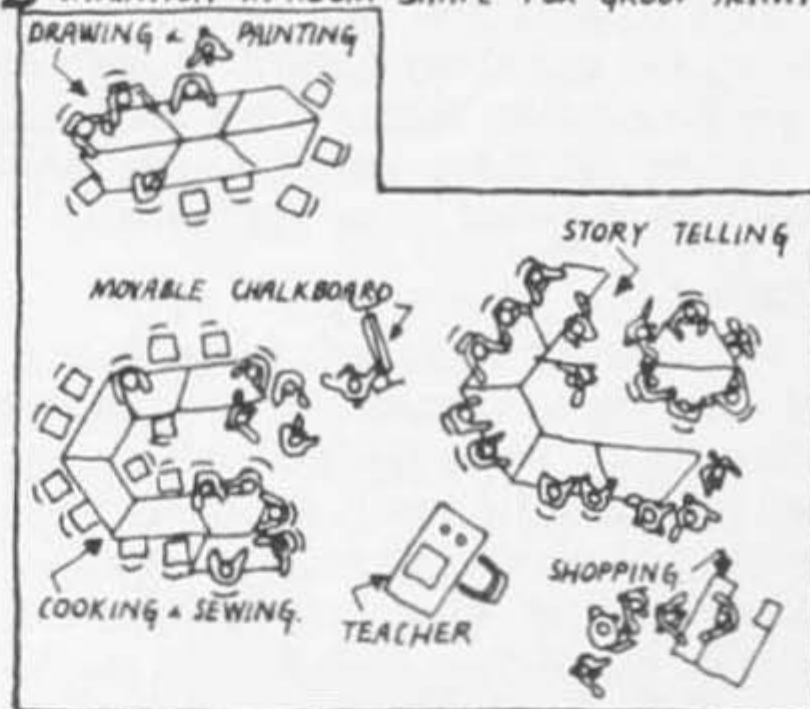
Educational requirements

92. A sense of security has already been mentioned as one of the most important needs of young children. It becomes clear, therefore, that the old type of institutional classroom approach from a corridor where large numbers of other children are crowding, is not appropriate for the youngest infants who are new to school life. A basic change of scale is called for, from that of an

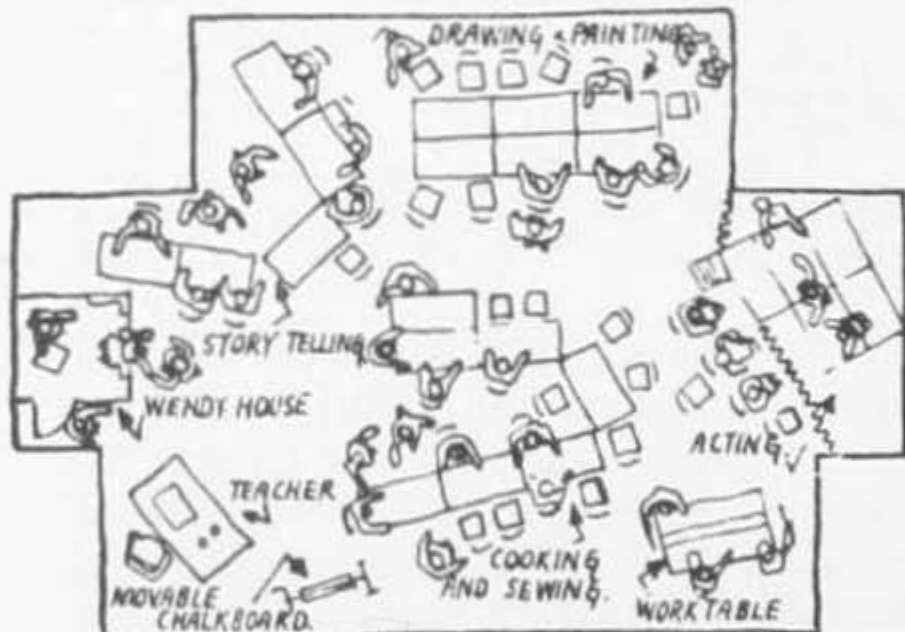
A GROUP ACTIVITIES IN SQUARE ROOM



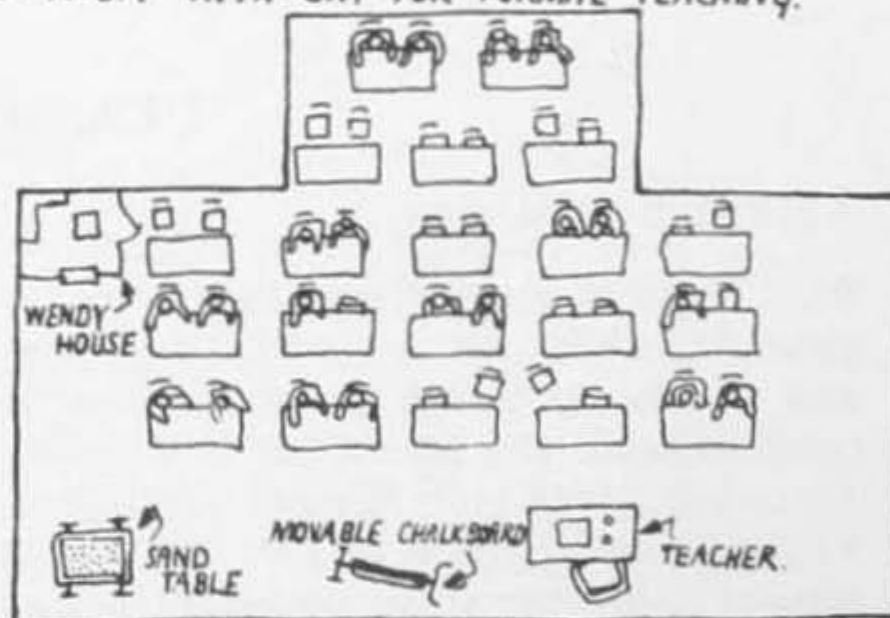
B VARIATION IN ROOM SHAPE FOR GROUP ACTIVITIES



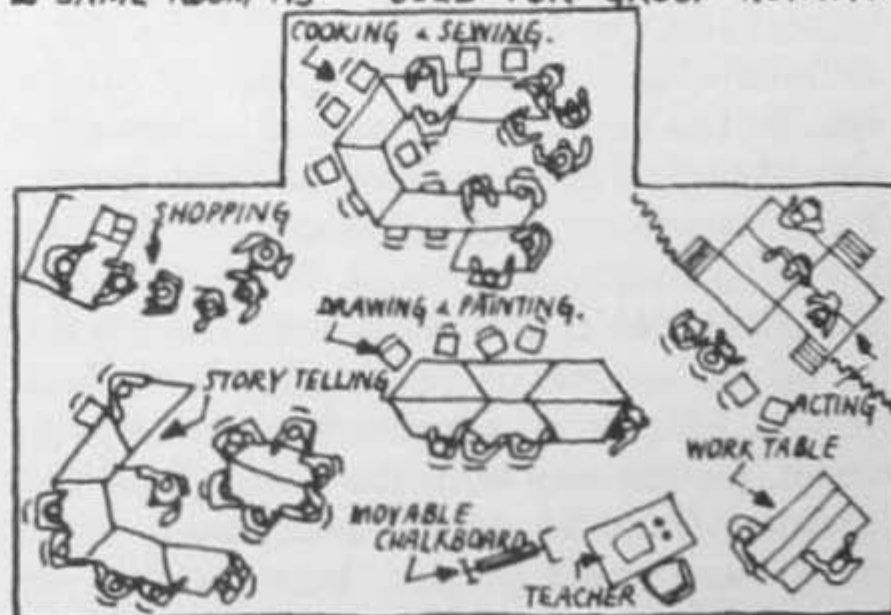
C ANOTHER VARIATION FOR GROUP ACTIVITIES



D ROOM WITH BAY FOR FORMAL TEACHING.



E SAME ROOM AS USED FOR GROUP ACTIVITIES.



1. GROUP ACTIVITIES CAN TAKE PLACE IN SQUARE ROOMS, BUT THEY DO SUGGEST THE POSSIBILITY OF VARIATIONS
2. THEY LEAD TO INTERESTING WINDOW AND EQUIPMENT ARRANGEMENTS, NEITHER OF WHICH ARE SHOWN IN THE DIAGRAMS.
3. ALL TABLES ARE FOR TWO CHILDREN AND CAN BE RECTANGULAR OR TRAPEZOIDAL. THE LATTER ENCOURAGE GROUP ARRANGEMENTS.

DIAGRAM.
8.

INFANTS
CLASS SPACES.

institution to one more in keeping with the small world which children inhabit, so that they will feel welcome and at home. Sometimes we forget how near the ground children do in fact live, and how important it is for them to be able to see out of windows, to open doors, to look with detailed intensity at a picture hung on the wall. These children need a small domestic environment, which could include its own front door, sanitary accommodation and cloaks space, its own class area and its own piece of garden. Within this self-contained area the children can almost live as an independent group at first, with the teacher able to watch and help them. Thus they can gradually get accustomed to the larger school community and to taking a share in its wider activities. (See Diagram No. 7.)

93. Young children are intensely interested in the objects around them—their shape, form, colour and use; “at once absorbed in creating their own miniature world of imagination and emotion, and keen observers who take pleasure in reproducing their observations by speech and dramatic action.” . . . ⁸ Part of the time they will spend in small groups, learning by imagination and experiment (shopping, dressing-up, cooking, painting, hammering, modelling); part of the time they will spend more quietly in larger groups perhaps, listening to stories, learning to read, write and count. The “directional” classroom, with its rigid rows of desks (“to stuff the desk-bound child with facts”)—is not suitable to the needs of young children.

94. The class space is becoming, instead, an enlarged “family room,” colourful, homelike and informal. There may perhaps

be forty children, with forty different approaches to many interests, and space must be thought of in terms of these small, simultaneous activities, with a wide range of easily accessible materials and tools. It may be that a simple rectangular plan shape is not the most suitable for infants, and within the recommended areas the possibilities of an alcove, recess, or a small area which can be curtained off to form a space for a “house” or a “shop” might be investigated. Perhaps sometimes the prescribed stores might be in the form of alcoves, so long as a lock-up cupboard is provided. (See Diagram No. 8.)

95. The older children will begin to investigate not only their immediate surroundings but the neighbourhood in which they live, gradually extending their interests to wider spheres. They will be taken out into the community (into the factories, farms, workshops) and the community will be brought into the school (maps and wall newspapers, models and pictures, school shops and banks). Many school projects will lead to analagous activities outside the school, showing the interdependence between the two environments. There will consequently tend to be a wide range of practical work in all the rooms and not only in the general purpose rooms; wall, floor and storage space will be needed on an increasing scale. Ideally, every junior class space would have a small work annexe opening out of the main room, with a bench or strong table, gas or electric points, sink, cupboard and shelves. But such additional accommodation will have to be deferred until the cost of building is reduced. If general purpose rooms are included, they will be useful for the older juniors especially, with their growing interest in more specialised crafts. They will be able to work on quite large-scale undertakings, which may take a number of weeks to complete.

⁸Report of the Consultative Committee on the Primary School, 1931. H.M.S.O. 1931 (Reprinted 1960)—8s. (by post 8s. 8d.).

INFANTS

JUNIORS

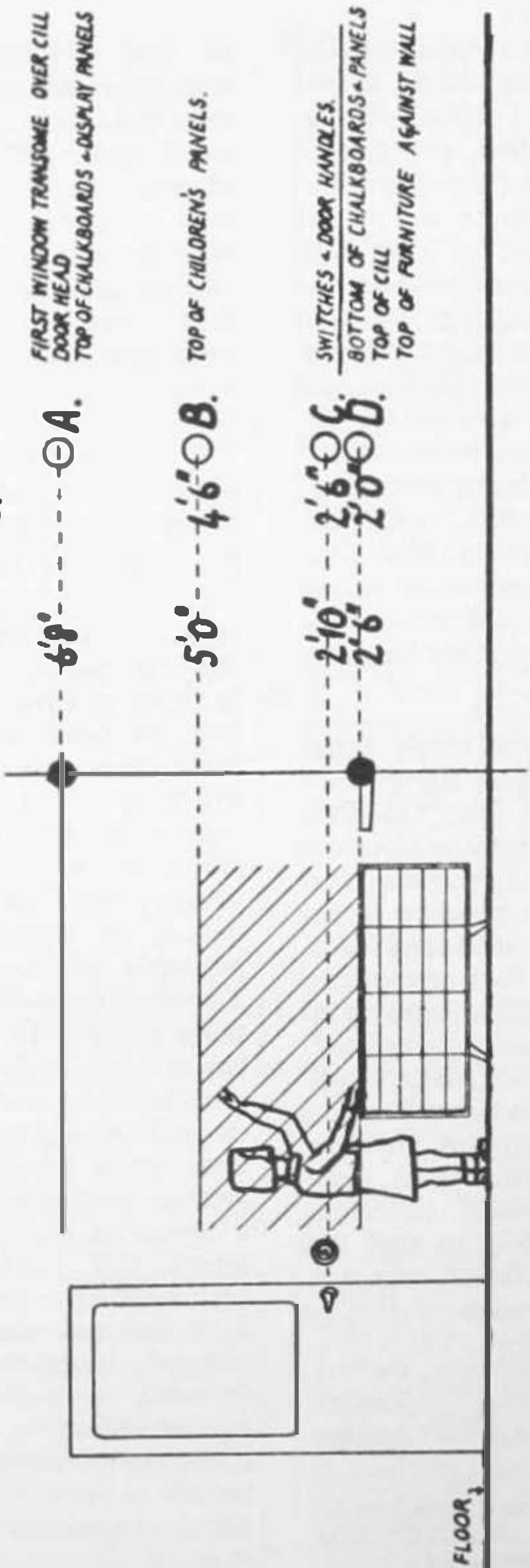


DIAGRAM. SHOWING HOW MAIN ELEMENTS IN CLASS SPACES CAN BE RELATED TO CHILDREN'S MEASUREMENTS.

2. NOTE: ALTHOUGH DIMENSION 'D' IS RAISED 6" FOR JUNIORS, WINDOW CILL SHOULD REMAIN AT 2'0".

General setting

96. The design of a class space can be controlled and unified by relating all its parts to the sizes of the children who will inhabit it. The need for comprehensive anthropometric data for this and for all kinds of school equipment is realized. The Ministry is in touch with those who are collecting this data and it is intended that this shall form the subject of a subsequent bulletin. All quotations of children's dimensions in the text or in the diagrams are the result of only very small-scale amateur surveys, and cannot be taken as authoritative.

97. Diagram No. 9 shows the relation of the main elements in class spaces to children's measurements. Dimension B need not be used, and all pin-up boards can be taken to doorhead level if desired; but if this dimension is observed, the appropriate children's scale will be emphasised.

Fixed equipment

98. Having determined these main proportions, care must be taken not to destroy them but rather to emphasise them by the detailed design of fittings and colour treatment within the general framework.

99. Individual items, such as chalkboards, pin-up panels, sinks, cupboards, milk trays, should not just be inserted on their own merits, but should be considered as part of the whole scheme. Unless this is done, they may seriously conflict with each other, and produce an uncomfortable and restless room.

100. The general proportions of the chalkboard and pin-up panels have already been indicated. Until recently it has been assumed that there should be one teacher's chalkboard which is the focus of attention: but with the changes in the methods of teaching, one fixed chalkboard position is no longer appropriate for infants, and is becoming

less important for juniors. Instead, all the factors affecting the wall area between the heights of 2 ft. 0 in. and doorhead level need to be considered together, such as pin-up areas for pictures, notices, etc., drawing surfaces for the children, and chalkboard surfaces for the teacher's demonstration. It would be a mistake to prescribe too rigidly the amount of wall surface needed for each of these requirements. The simplest and most flexible solution would be to find one material which would be capable of receiving different colour treatments to serve all of them. This does not appear, however, to be possible at the moment, so that different materials will have to be selected, and appropriate placing and sizes will have to be agreed in accordance with local requirements. These areas are so important that it is safe to say that all available wall surfaces between the two heights should be used for them.

101. This leaves from ground level up to 2 ft. 0 in. for wall equipment, either moveable or fixed. For infants, as has already been mentioned, large quantities of different materials and tools need to be easily found and easily put away by the children themselves. This suggests the maximum amount of simple cupboard space at this low level, rather than individual items of furniture designed to take special equipment within the room. Infants' sinks and milk trays can be accommodated within this general height level, and also small wall locker units for the children's personal belongings where flat-topped tables are used instead of desks.

102. The top of locker units should not be higher than approximately 2 ft. 0 in. to 2 ft. 6 ins., so that it will not interfere with the pin-up panels, and so that it can be used as a "working surface." Each locker will only have to be large enough to take

the odd personal belongings of the children (probably about 10 in. \times 7 in. \times 6 in. high for the younger children and 13 in. \times 8 in. \times 6 in. high for the older ones). All these lockers will be a permanent piece of class equipment; space will have to be allocated for them to be fixed as part of the whole room design, probably along one of the partition walls but not under the main windows. The locker units could either be in the form of small trays which could be taken out, or merely pigeon-holes with flap-down doors to cover them. Any other special fittings, such as display shelves for picture books, which may be thought to be necessary ought, too, to be designed to come within this general framework.

103. For juniors there is no need for the bottom of the pin-up and chalkboard area to come below 2 ft. 6 in., and this will give more space for fixtures or furniture except on the window wall where the sill should still be kept down to 2 ft. 0 in. A similar arrangement to that described for infants will be needed, but with possibly more special types of fittings, particularly in general purpose rooms—(such as bin storage, display cases, bookshelves, etc.)—which can be worked out in accordance with each local authority's wishes so long as they fit into the main dimensional framework.

Storage space

104. The fittings for storage of materials and tools inside the room itself will of course have to be supplemented by separate but adjacent store-rooms or cupboards. This storage space is extremely important, and care should be taken to make sure that sufficient provision is made. It is generally considered that the store should open directly out of the class space. The size and shelving requirements will be agreed with the educators, but on the whole it is necessary to provide as much space

for infants as for juniors, for their materials and equipment take up a considerable amount of space. The shelving should in any case be wide enough to take imperial sheets of paper and cardboard. Musical instruments may sometimes be kept here.

Furniture and movable equipment

105. Furniture designed for primary schools (both for children and teachers) has undergone radical changes, like the rest of the school. It is now being designed and selected for comfort and correct posture and not, as in the past, exclusively for ease of maintenance and durability which resulted in the immovable solidity of cast-iron and pitch pine, which have not yet entirely disappeared.

107. Furniture can only become an integrated part of the whole if its selection is the responsibility of the architect who builds the school. So long as maintenance of school furniture was the chief concern, it was natural for an administrative officer to have this responsibility, but it does not follow that this is a valid procedure for new schools.

108. If the furniture is to be cheap to manufacture and simple to arrange in the class spaces, it will not be possible to make as wide a selection of sizes as surveys may suggest. It should not be necessary to have more than two (or at most three) size ranges of furniture in any one class space. Dimensional surveys and fitting trials have been carried out for a forthcoming British Standard on school furniture. The British Standards Institution have kindly agreed to the publication in this Bulletin of the information opposite. Table 1 gives the percentage distribution of chair and table sizes for each year in the primary age range, and Table 2 gives the critical dimensions for each of the sizes required.

109. In the infants' room, tables will be used for many different purposes, such as

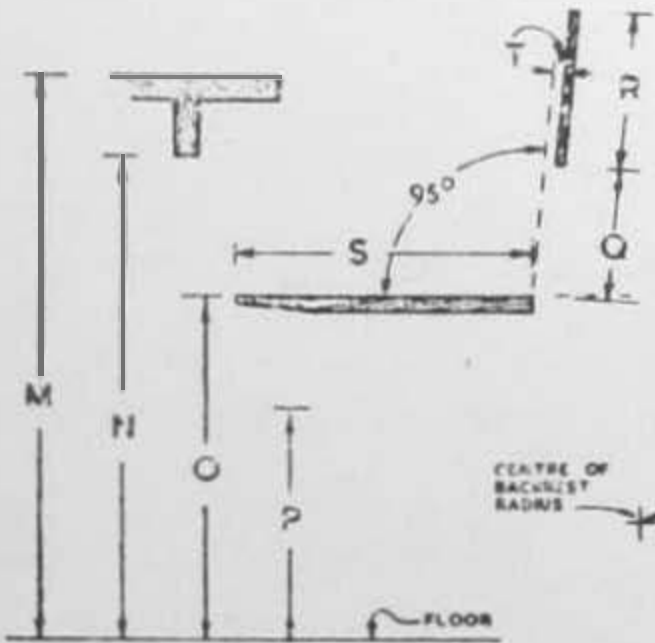
Table 1. Chair and Table Sizes according to Pupils' Ages

	Pupils' ages (years)	Pupils' mean height (ins.)	Percentage of pupils requiring chairs and tables of sizes:			
			A	B	C	D
Boys and girls	5-6	44	90	10	—	—
	6-7	46	65	35	—	—
	7-8	48	30	70	—	—
	8-9	50	10	75	15	—
	9-10	52	—	60	40	—
	10-11	54	—	30	65	5
	11-12	55	—	—	90	10

Table 2. Recommended Dimensions of Chairs and Tables (in inches)

Dimensions (See Figs 1 and 2)	Chairs with <i>flat</i> seats of sizes:				Chairs with <i>sloping</i> seats of sizes:			
	A	B	C	D	A	B	C	D
"M"	19	21	23	25½	18	20	22	24½
"N"	16	18	20	22½	15	17½	19½	22
"O"	11	12½	14	15½	11	12½	14	15½
"P"	7½	8½	9½	10½	7½	8½	9½	10½
"Q"	5	6	6½	6½	5	6	6½	6½
"R"	5	5	5½	6½	5	5	5½	6½
"S"	9½	11	12½	14	9½	11	12½	14
"T"	½	½	½	½	½	½	½	½
"U"	10	12	12	14	10	12	12	14
"V"	6½	7½	8	9½	6½	7½	8	9½
"W"	9	10	10	11	9	10	10	11
"X"	16	16	16	16	16	16	16	16

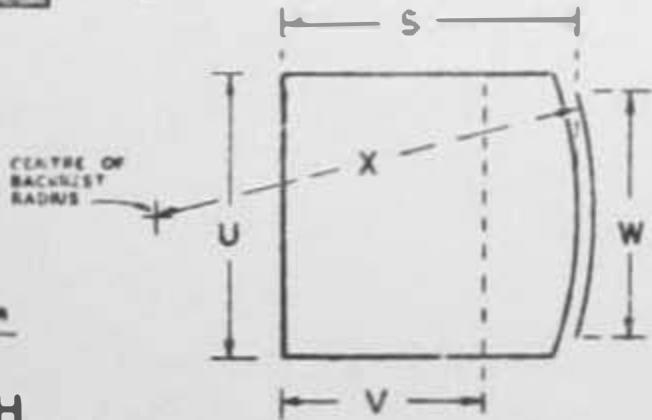
FIG. 1.



SECTION THROUGH CHAIR WITH FLAT SEAT

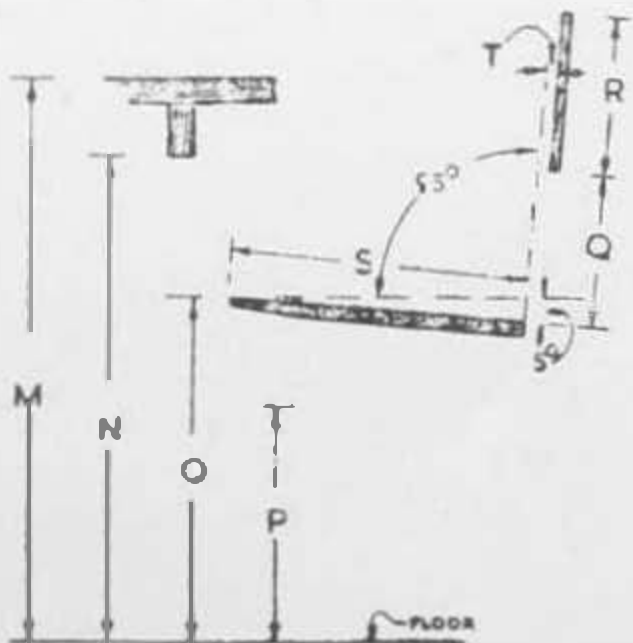
P = height to underside of cross rail between front legs.

V = ½ S, and the dimension U applies at the dotted line.



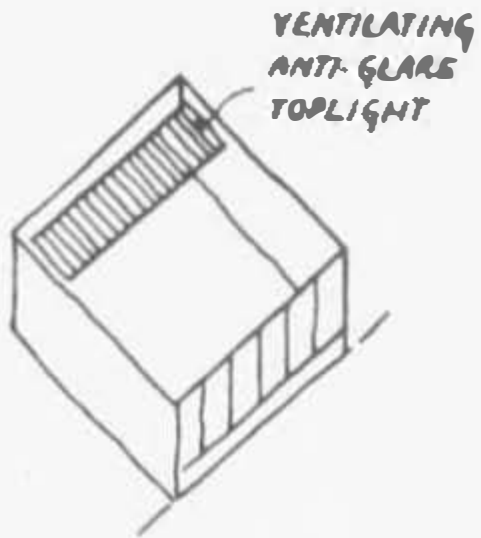
PLAN OF CHAIR

FIG. 2.

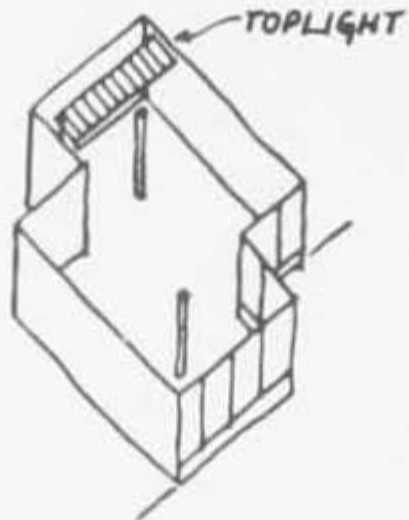


SECTION THROUGH CHAIR WITH SLOPING SEAT

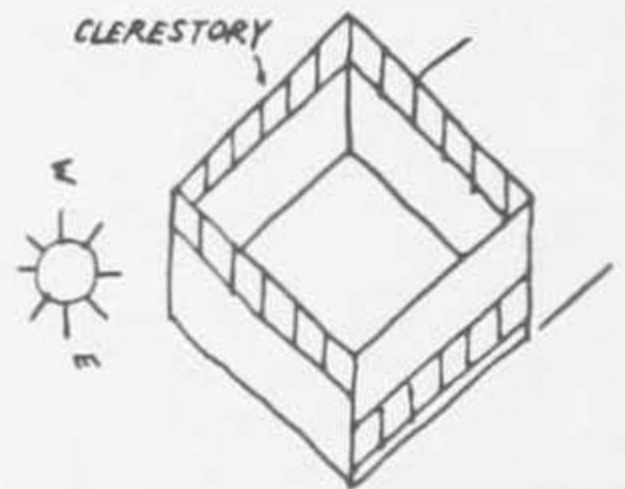
NOTE: The above information is based on draft material at present being considered by the British Standards Institution who have kindly agreed to its use at this early stage.



LOW BLOCK



LOW BLOCK



SEE SEPARATE NOTE FOR THIS SPECIAL CASE.

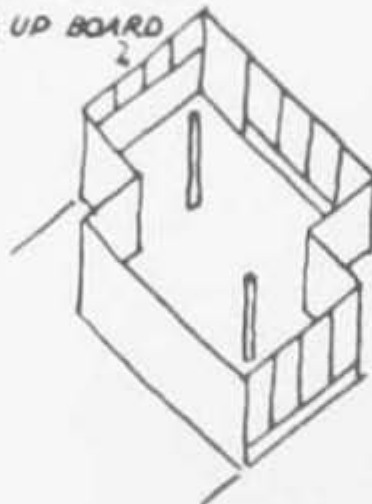
MEDIUM BLOCK



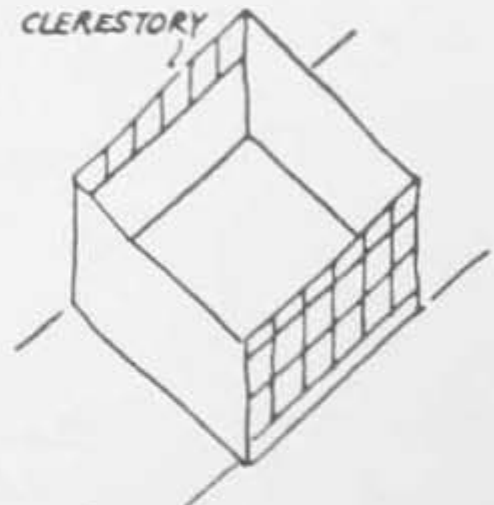
LOW BLOCK



WINDOW OVER
PIN UP BOARD



LOW BLOCK



MEDIUM BLOCK



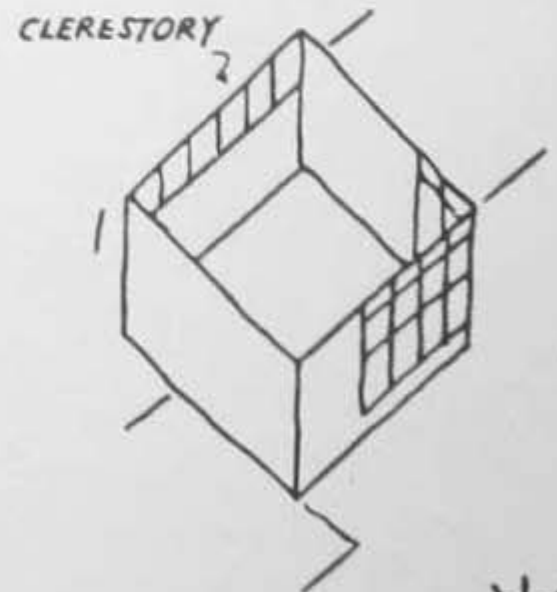
A VARIETY OF PLAN FORMS FOR CLASS SPACES MAY BE EDUCATIONALLY DESIRABLE. THEY ARE ALSO NECESSARY TO OBTAIN THE BEST DAYLIGHT AND VIEW UNDER VARYING SITE CONDITIONS.

LOW BLOCK IS APPROX 8'6" HIGH

MEDIUM BLOCK IS APPROX 12'0" HIGH

**DIAGRAM
10.**

CLASS SPACE
ARRANGEMENTS.



MEDIUM BLOCK



can be seen from any point in the room, or to reduce its brightness.

116. When straight blocks of teaching rooms are built, the familiar clerestorey lighting will be necessary, or some form of carefully-designed ventilating top-light (which would have the advantage of permitting a lower ceiling). However, this must be regarded as only one of the possible solutions, for many conditions will call, as already suggested, for freedom of planning to give more individual treatment of the class spaces. These varying plan forms will certainly encourage more variety also of window treatment, which in turn will result in more variety and interest in the lighting conditions within the rooms. Experience suggests that some such arrangements are cheaper than the usual clerestorey arrangements, because if eye-level windows are provided on more than one wall, the height of the ceiling can be lowered without reducing the amount of daylight below the statutory requirement. This not only gives a more domestic scale to the room (particularly welcomed for the infants), but effects a considerable reduction of cubic content. Whatever arrangement is adopted, some form of cross ventilation must of course be provided.

117. In Diagram No. 10 it will be seen that in most cases the large windows will face the sun, but case "F" shows an arrangement, not generally recommended but useful where there is an excellent view to the north, or where, if the main windows faced south they would look into a steeply rising bank.

Sunshine

118. So far daylighting has been discussed, as opposed to actual sunshine, which of course greatly affects the lighting of a room. What is probably the earliest recommendation for school buildings (1815)

suggested that if light were admitted from one side, it ought to be from the north, "that being the steadiest, and freest from sunshine." But to-day the importance of getting sunshine into habitable rooms is universally recognised: nevertheless the fullest advantages are not always taken of the alternative plan arrangements to ensure the maximum amount. It is important to remember that, especially in winter, rooms which are going to be occupied at 9 o'clock in the morning will give a warmer welcome if the sunshine has already penetrated into them, even through high up side windows. It is, however, essential to be able to regulate the amount of sunshine—without some form of control, excessively bright reflections from table tops and windowsills, and a distracting pattern of shine and shadow on the wall surfaces, will cause discomfort and eye strain. Common devices of fins and canopies do not cater for all the conditions that may commonly arise, though they might be reasonably satisfactory if the children faced only in one direction all the time. But in order to satisfy the much more difficult conditions of modern teaching, with the children often working in small, informal groups which may face in any direction, a more flexible system of sunshine control becomes necessary. Some form of louvred blind, therefore, is to be recommended (although existing patterns need to be developed to meet school requirements). Not only does a louvred blind produce, in a delightful way, an interesting and stimulating small-scale pattern, but is likely to be cheaper than fixed sun-shields.

119. One of the class spaces can be darkened, if required, for the projection of films; absolute darkness is not essential, and well-fitted louvred blinds for the main windows should answer the purpose, if other blinds are fitted over the clerestory windows.

are always seen against the sky, and because their surrounding areas are usually in shadow, are often the cause of considerable visual discomfort. Careful design of the reveals is therefore called for, so that the contrasts between light and shade are not too acute; glare will be reduced if the adjacent low roofs can have light-reflective surfaces.

Artificial lighting

127. Although it may be necessary for the architect to get specialist advice on technical aspects of the lighting installation, the design of the fittings and their arrangement in the building should be entirely under the control of the architect. As in daylighting, the quantity of artificial lighting must be combined with quality. The emphasis in the codes of practice seems to have been laid mainly on quantity. But the flat quality of lighting provided by the common types of diffused fittings lacks an appropriate degree of sparkle and stimulation. This "appropriate degree," however, calls for considerable skill in design, as too much sparkle will cause discomfort through glare, in just the same way as in day lighting. Most school fittings seem to produce either too much glare or too uniform a light, in both cases tending to attract the eye up to the ceiling, the one type by its size, the other type by its brilliance. The trouble may be remedied by providing a larger number of smaller fittings, which could form a restful ceiling pattern with a degree of stimulation that is not bright enough to be distracting. The Ministry is working on this problem with the Building Research Station, and is carrying out tests with different types of fittings. Artificial lighting in primary schools will not in any case be used extensively; therefore simpler fittings, which can be produced cheaply in quantity, may be more appropriate than the comparatively expensive ones commonly available. A discussion on the use of fluorescent

lighting is outside the scope of this first bulletin.

Acoustics and sound insulation

128. In class spaces the ceiling will probably be the easiest surface to treat with sound absorbent materials. A reverberation time of 0·5 to 1·0 sec. (at 500 c.p.s.) seems to provide pleasant conditions. A high degree of sound reduction between the teaching rooms in a primary school is not perhaps so important as in some other types of buildings, except where music is likely to be played. Between teaching spaces an average sound reduction of 30 db. is probably the least that can be considered satisfactory. Even where no store-rooms are planned between two adjacent teaching spaces, a single leaf of $4\frac{1}{2}$ ins. brickwork, or its equivalent, will give just enough sound insulation.

Heating

129. Detailed analysis is beyond the scope of this particular bulletin, which can only include a few notes on the relative merits of different types of installations.¹¹

130. Many factors affect the choice of a heating system for class spaces. The high rate of ventilation would suggest a radiation system; but the intermittent use of the rooms (requiring rapid heating and cooling for the sake of fuel economy) and the light forms of construction which are becoming more common (with low thermal capacity) would suggest a convection system. With these types of structure it is, however, essential to have good insulation, at least to standards recommended in the Post War Building Studies No. 27 (Heating & Ventilation of Schools—H.M.S.O.).

¹¹Building Bulletin No. 13 "Fuel Consumption in Schools". 1st Supplement. Tests with Oil-Fired Warm Air System. 1s. 3d. (by post 1s. 6d.). 2nd Supplement. Tests with Coal-Fired Automatic Stoker Warm Air System. 1s. (by post 1s. 3d.)

131. The heating should certainly be controlled thermostatically and by a time switch, in view of the fact that out of the 168 hours of each week the class spaces will probably not be used for more than about 35 hours. Overheating would thus be prevented, and running costs would be lowered.

132. The location of pipes, radiators or other high temperature sources is of great importance in class spaces, where every inch of wall area, from the floor to door head height is needed for educational purposes. This heating equipment is bound

to limit the use of the wall space to some extent, and should be reduced to the minimum. If heat sources are placed against external walls under large windows—even when there may be only a very small area—good insulation is essential if excessive heat loss at this point is to be prevented.

133. Very often the real cost of the heating installation is concealed, because a considerable proportion is included in builders' work. This builders' work may be out of all proportion to the cost of the installation in primary schools if elaborate or large-scale floor ducts are included.

COAT HANGING AND SANITARY ACCOMMODATION

Dispersal

134. The dispersal of these spaces has been recommended, but to what degree will obviously depend on particular planning solutions. If designed with sufficient skill, a break-down into quite small units (to serve one, two or three class groups of children) can be as cheap as some of the more common, centralised arrangements. The high ceilings, necessary for the ventilation of the large centralised blocks, can be lowered, reducing the cube, and the circulation space and wall area per child can also be cut down. The teaching of hygiene is an important aspect of education, and there is no doubt that smaller units of sanitary accommodation planned in close relationship to particular class spaces, or groups of class spaces, will be welcomed by teachers. Also the comparatively small numbers of children using each unit will engender better behaviour than the large concentrations in centralised blocks. However the sanitary accommodation is divided up for the rest of the school, it is most desirable for the five-year-olds to have their own separate space (sub-divided of

course for boys and girls) attached to each class space or to each pair of class spaces. This will facilitate the best supervision and training, and will help to keep the class group area self-contained and domestic in scale.

General planning

135. If the coat-hanging accommodation is planned in small areas, it need no longer present a dominating array of crude metal screens and fittings, but can become a simpler arrangement more in keeping with its function. It will not always be necessary to provide separate rooms; varying alternatives are possible, such as, for example, alcoves or bays opening off the main circulation area. Good ventilation is necessary, as has already been mentioned, and in schools which have no special drying rooms, the heating should be capable of being temporarily increased in the coat-hanging space. The fittings should be arranged if possible at right angles to the source of light. The simpler the fittings, the better; after all, hats, coats and shoes should not require a highly-complicated structure.

Doctor's room

147. A space will be needed where medical inspections can be carried out. It is not always necessary to provide a separate doctor's room. The special requirements are:

- (1) a wall light point for an eye testing chart;
- (2) a sink or basin with hot water;
- (3) a power point for sterilizing apparatus and for supplementary local heating;
- (4) sanitary accommodation nearby.

These requirements can often be met by carefully designing the staff room, the second teacher's room (where there is one) or even a classroom or a part of the hall such as an alcove. The 20 ft. required for eye testing can usually be found either by using a room diagonally or by looking from an adjoining space through the communicating door or, in restricted circumstances, by the use of mirrors. There should also be sufficient space close to the doctor's room where parents and children (the latter often in quite large groups) can wait their turn. This space will, of course, be available at all other times for other purposes. It might, for instance, be furnished as a small library.

Boiler house and caretaker's accommodation

148. The rest of the administration area is concerned with the maintenance of the building: boiler house and fuel store, meter and switchboard cupboards, storage for cleaning stock and caretaker's room.

149. When schools are of moderate size (as they are encouraged to be) it is quite possible to design the boiler house as an ordinary space at ground level, avoiding special construction and additional cost. If it were really efficiently designed it could, by means of explanatory diagrams of how the system works, be of considerable

educational interest to the older children. The uncertainties of fuel delivery nowadays suggest that a neat overflow storage space might be provided at the outset.

150. Caretakers and cleaners have their own problems which are not always considered with enough understanding. Space will be required for:

- (1) long-term storage of materials, including quite large quantities of such things as polish, saw-dust, electric light bulbs, soap, etc.;
- (2) storage of day-to-day cleaning equipment, such as brooms, buckets, mops, etc. A sink will be necessary, and if hot water is provided here the cleaners will not be tempted to use the supply in the kitchen. Coat-hanging space is also needed, as in the larger schools there may be four or five people coming in to clean;
- (3) space for the caretaker to carry out odd jobs of repair, and to have a cup of tea.

151. The position of these spaces in the school will of course vary with each plan arrangement, and will depend on the architect, in his imagination, carrying the buckets and cleaning the school himself. This is not the place to enlarge on methods of cleaning schools but some form of vacuum cleaning is to be encouraged. It would be simple to provide the required electric points if a decision were made in time.

152. If a house for a caretaker is to be provided, either initially or in the future, its siting should be carefully considered in relation to the whole layout.

The kitchen and ancillary rooms

153. It is not intended in this revised edition to say anything about the planning of kitchens and their ancillary rooms. The subject has been fully dealt with in Building Bulletin No. 11 "Design of School Kitchens."

SCULPTURE AND MURAL DECORATION

154. Some local authorities have allocated a small proportion of the cost of new schools for the work of sculptors and mural painters and this is greatly to be encouraged.

155. With present methods of construction sculpture can contribute probably more successfully to the character of the school when it is free-standing than when it is carved into a wall surface, or placed in a special niche. It is usually good to look all round a piece of sculpture, and the backgrounds (what they are, and how far away) want careful thought; an informal siting is often the most effective.

156. Mural paintings can only be really

successful if the artist can co-operate with the architect in the earliest stages of the school design, and if he can fully understand the ideas behind the design. Like the treatment of colour, mural paintings should help to express and clarify the structural forms, and the character of their environment; they should not be looked upon as "embellishments" to be added to the finished building. Space might also be allocated for children's mural work. The "professional" mural must not make the children feel that their own paintings are crude nor should it play down to them, but rather encourage them to try for themselves.

CONCLUSION

157. This bulletin concludes at the point at which it began: the importance of visualising the design of schools as a whole, and not in isolated parts. In such an intricate and complex undertaking as a school building programme, involving so many different experts (even within one local authority) before every aspect of the problem is covered, it is essential that there shall be the closest collaboration between all concerned—educators, architects, surveyors, town planners and specialist consultants. So often these experts work in water-tight compartments; for instance, the designer of a school may never have direct access to the client for whom he is building, but may have to work through an intermediate authority; or an administrative officer may have to order furniture and fittings without having direct contact with the architect. What is needed is a *team* of experts, with the architect responsible for maintaining a balance between all aspects,

ensuring that the contribution of each specialist is properly related to the whole.

158. Moreover, there could be more co-operation between different education authorities. Exchange of ideas and information, and visits to other schools in course of building or already occupied, need not lead to imitation and monotony of school design, but could stimulate initiative and imagination.

159. The relative merits of different forms of construction that might be employed for school building have purposely not been discussed in this bulletin, but enough has probably been said to suggest that schools have a more complicated set of requirements than many existing systems of construction are designed to serve. These educational needs are not only complex, but often conflicting, and the architect's task is to simplify them without compromising them, in order that they shall be

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